

CLAIMS

Claim 1 (currently amended): An improved damping or reinforcement structure for an automotive vehicle, comprising:

a wall of a first material;

a layer of metal foam opposing the wall of the first material; and

a layer of structural adhesive bonded to the wall and the layer of metal foam;

wherein the layer of adhesive separates the wall from the layer of metal foam such that a significant amount of open space is between the wall and the layer of metal foam; and

wherein the layer of adhesive is applied as a continuous or non-continuous strip extending adjacent a peripheral edge of the wall or the layer of metal foam; and

wherein the layer of adhesive substantially surrounds the open space.

Claim 2 (canceled)

Claim 3 (canceled)

Claim 4 (canceled)

Claim 5 (original): A structure as in claim 1 wherein the adhesive is a heat expandable material.

Claim 6 (original): A structure as in claim 1 wherein the structure thickness is no greater than 75 mm.

Claim 7 (original): A structure as in claim 1 wherein the structure thickness is no greater than 50 mm.

Claim 8 (original): A structure as in claim 1 wherein the wall and the layer of foam material are substantially coextensive with each other.

Claim 9 (original): A structure as in claim 1 wherein the wall and the layer of foam material are located between a passenger compartment and an engine compartment of the automotive vehicle.

Claim 10 (original): A structure as in claim 1 wherein the adhesive has a glass transition temperature greater than 70 °C

Claim 11 (original): An improved damping or reinforcement structure for an automotive vehicle, comprising:

a panel formed of a first material, the first material being a metal;
a layer of foam material formed of a metal foam selected from magnesium foam and aluminum foam;

a viscoelastic adhesive that is bonded to the panel and the layer of foam material;
and

a structural adhesive that is bonded to the panel and the layer of foam material
wherein:

- i) the structural adhesive is a heat expandable material; and
- ii) the structure is located between a passenger compartment and an engine compartment of the automotive vehicle.

Claim 12 (original): A structure as in claim 11 wherein the adhesive separates the layer of foam material from the panel and at least 50 % of the space between the panel and the layer of foam material is filled by the viscoelastic adhesive.

Claim 13 (original): A structure as in claim 12 wherein the structural adhesive is applied as a continuous or non-continuous strip extending adjacent a peripheral edge of the panel or the layer of metal foam.

Claim 14 (original): A structure as in claim 13 wherein the structural adhesive substantially surrounds the viscoelastic adhesive.

Claim 15 (canceled)

Claim 16 (original): A structure as in claim 11 wherein the structure thickness is no greater than 50 mm.

Claim 17 (original): A structure as in claim 11 wherein the panel and the layer of foam material are substantially coextensive with each other.

Claim 18 (canceled)

Claim 19 (original): A structure as in claim 11 wherein the adhesive has a glass transition temperature greater than 70 °C

Claim 20 (canceled)

Claim 21 (new): A structure as in claim 11 wherein the panel and layer of foam material are located in a region that separates the passenger compartment from the engine compartment.

Claim 22 (new): An improved damping or reinforcement structure for an automotive vehicle, comprising:

a panel formed of a first material, the first material being a metal;

a layer of foam material formed of a metal foam; and

an adhesive that is bonded to the panel and the layer of foam material wherein:

- i) the structure is located between a passenger compartment and an engine compartment of the automotive vehicle.

Claim 23 (new): A structure as in claim 22 wherein the panel and layer of foam material are located in a region that separates the passenger compartment from the engine compartment.

Claim 24 (new): A structure as in claim 22 wherein the metal foam is selected from magnesium foam and aluminum foam.

Claim 25 (new): A structure as in claim 22 wherein the structural adhesive is a heat expandable material.

Claim 26 (new): A structure as in claim 22 wherein the panel and the layer of foam material are substantially coextensive with each other.

Claim 27 (new): A structure as in claim 22 wherein the layer of adhesive separates the wall from the layer of metal foam such that a significant amount of space is between the wall and the layer of metal foam

Claim 28 (new): A structure as in claim 22 wherein:

- i) the panel has a thickness of between about 1.0 mm and about 2.0 mm;
- ii) the first material is selected from aluminum, steel or magnesium;
- iii) a layer of viscoelastic adhesive is bonded to the panel, the viscoelastic adhesive being thermally expandable from about 5% to about 2000% its original size at a temperature of 200 °F or greater, the layer of viscoelastic adhesive being between about 0.5 and about 2.0 mm thick; and
- iv) the a metal foam is bonded to the viscoelastic adhesive, the metal foam being selected from aluminum foam and magnesium foam, the layer of metal foam being between about 12 mm and about 15 mm thick;
- v) each of the panel, the layer of viscoelastic adhesive and the layer of metal foam are disposed between a passenger compartment of the automotive vehicle and an engine of the automotive vehicle;
- vi) the layer of foam is closer to the engine than the panel; and
- vii) the reinforcement structure can be packaged for a thickness of no greater than 50 mm thick.